67. $f(3)=4$ solve$\left(\int_a^3 \ln(2+\sin t)\,dt = 4, a\right)$

$a = -3.385$

$f(5) = ?$ $\int_a^5 \ln(2+\sin t)\,dt \;\Big|\; a=-3.385$

$\int_a^3 + \int_3^5 = \int_a^5$

$\downarrow$

$4 + \int_3^5 \ln(2+\sin(t))\,dt = \int_a^5 = f(5)$

$.555$

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HW. 53 solve$\left(\int_0^x e^{-t^2}\,dt = .6, x\right)$

graph $f1(x) = \int_0^x e^{-t^2}\,dt$

$f2(x) = .6$

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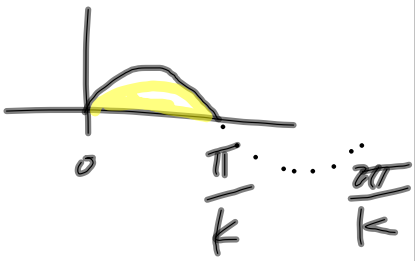
63. $y = \sin(kx)$

period $= \frac{2\pi}{k}$



$$\int_0^{\frac{\pi}{k}} \sin(kx)\,dx \quad \text{prove} = \left(\frac{2}{k}\right)$$

$$\frac{-\cos(kx)}{k}\Bigg|_0^{\pi/k} = \frac{-\cos(k\frac{\pi}{k})}{k} + \frac{\cos 0}{k}$$

$$\frac{1}{k} + \frac{1}{k}$$

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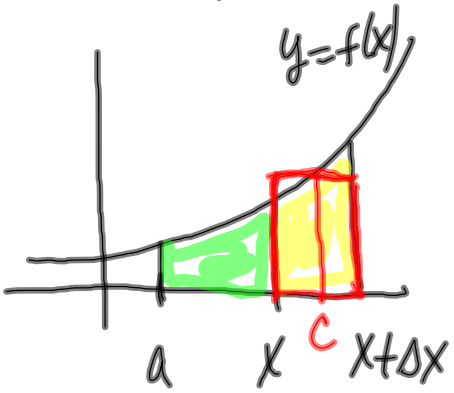
5.4b proof of FTC



$$F(x) = \int_a^x f(t)\,dt$$

ΔF = total area $= F(x+\Delta x) - F(x)$

$$\Delta F = f(c)\cdot \Delta x$$

$$\lim_{\Delta x \to 0} \frac{F(x+\Delta x) - F(x)}{\Delta x} = \lim_{c \to x} \frac{f(c)\cdot \cancel{\Delta x}}{\cancel{\Delta x}}$$

$$F'(x) = f(x)$$

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$$\frac{d}{dx}\int_a^x f(t)\,dt = f(x)$$

$$\frac{d}{dx}F(x) = f(x)$$

$$\frac{d}{dx}\int_0^x \cos t\,dt = \cos x$$

$$\frac{d}{dx}\int_0^{x^2} \cos t\,dt = \cos x^2 \cdot (2x)$$

read EX 3

der of x^2

chain rule

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